

Remarks

Reconsideration of the rejections set forth in the Office Action dated February 1, 2006 is respectfully requested. Claims 10-21, which were previously withdrawn, are canceled with the filing of this response. Claims 22-30 have been added. Claims 1-9 have been rejected. As such, claims 1-9 and 22-30 are currently pending

Claim 1 has been amended to recite that a polishing pad is arranged to rotate during wafer polishing. Support for this amendment may be found, for example, on page 7 of the Specification at lines 19-22. Claim 3 has been amended to recite electromagnetic actuators. Support for this amendment may be found throughout the Specification.

New claims 22-30 recite similar limitations as recited in claims 1-9, respectively.

Rejections under 35 U.S.C. § 112

Claim 3 has been rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Examiner argues that the specification is only enabling for electromagnetic actuators.

Claim 3 recites that a plurality of actuators are electromechanical actuators. It is noted that at the paragraph beginning on line 27 of page 23 of the Specification, the Applicants state that actuators are not limited to being electromagnetic actuators. However, in a sincere effort to expedite prosecution, the Applicants have amended claim 3 to recite “electromagnetic actuators.” As such, the Examiner’s rejection of claim 3 under 35 U.S.C. § 112, first paragraph, is believed to be overcome.

Rejections under 35 U.S.C. § 102 and 35 U.S.C. § 103

Claims 1-8 have been rejected under 35 U.S.C. § 102(b) as being clearly anticipated by U.S. Patent No. 4,606, 151 issued to Heynacher. Claims 1-3 and 7-8 have been rejected under 35 U.S.C. § 102(b) as being clearly anticipated by U.S. Patent No. 6,607,425 issued to Kistler et al. (hereinafter “Kistler”). Claim 9 has been rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Kistler or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Kistler.

The Applicants note that the Examiner repeatedly refers to Kistler as “US 00607425B1.” The Applicants assume that the Examiner means to refer to U.S. Patent No. 6,607,425. However, if this assumption of the Applicants is incorrect, it is respectfully requested that the Examiner provide clarification.

Independent claim 1, as amended, recites that a polishing pad is arranged to rotate during wafer polishing. Heynacher does not teach of a polishing pad that is arranged to rotate during wafer polishing. As described in Heynacher from column 2 at line 49 to column 3 at line 5, polishing pads 3 are carried on a plate/membrane 2 that has oscillatory movement. The polishing pads are not disclosed as rotating independently from the plate/membrane, and an oscillatory movement does not anticipate rotation. Therefore, claim 1 is believed to be allowable over Heynacher for at least this reason.

Kistler also does not teach of a polishing pad that is arranged to rotate during wafer polishing. At lines 1-31 of column 6, Kistler discloses that a polishing belt/pad 310 is pushed towards a platen 308, and that to promote polishing uniformity, piezoelectric elements 702 applies a zonal force to a polishing pad. There is no teaching of the polishing pad being arranged to rotate during wafer polishing. As such, claim 1 is believed to be allowable over Kistler for at least this reason.

Claims 2-9 each depend either directly or indirectly from independent claim 1 and are, therefore, each believed to be allowable over the cited art for at least the reasons set for above. Each of these dependent claims recites additional limitations which, when considered in light of claim 1, are believed to further distinguish the claimed invention over the art of record. By way of example, dependent claim 7 recites that a first actuator applies a second force to a polishing pad while second and third actuators each apply a first force to the polishing pad. The Examiner has argued that both Heynacher and Kistler teach of this limitation. Heynacher only discloses that forces of a plurality of loading units are individually adjustable (Heynacher, column 3 at lines 6-10), and that the loading units may be actuators that permit a pressure distribution to be developed (Heynacher, column 3 at lines 18-30). There is no teaching in Heynacher that the plurality of loading units or actuators includes a pair of loading units that each apply a first force and another loading unit that applies a second force. While Kistler appears to disclose using a plurality of piezoelectric elements 702 to apply force (Kistler, column 6 at lines 6-31), Kistler does not teach of or even reasonably suggest that two piezoelectric elements each apply a first

force while another piezoelectric element applies a second force. At lines 54-57 of column 6, Kistler discloses that central piezoelectric elements are often larger than those at the edge of a platen. However, there is no teaching in Kistler that there are two piezoelectric elements that each apply a first force while a third piezoelectric element applies a second force. Accordingly, claim 7 is believed to be allowable over Heynacher and Kistler for at least these reasons as well.

Dependent claim 4 recites that forces are determined based upon a position associated with a polishing pad, a first polishing pressure, an air pressure load on the polishing pad, and a distance between a center of the polishing pad and a center of gravity associated with a chemical mechanical planarization apparatus. In his rejection of claim 4, the Examiner states “the controller of ‘151 is ‘arranged’ to determine the forces of the actuators on the pad, in that the controller is a computer that is capable of determining forces based on any criteria desired.’ The Applicants respectfully disagree. Heynacher does not appear to disclose a controller, but does disclose a computer 16 that controls a motor 15 (Heynacher, column 3 at lines 37-40) and, further, that a computer determines an amplitude and frequency of oscillatory movement (Heynacher, column 3 at lines 3-5). Although a computer may be capable of determining forces, Heynacher does not teach that a computer determines forces applied to a polishing pad. Further, there is no teaching in Heynacher of an air pressure load on a polishing pad, or of a distance between a center of the polishing pad and a center of gravity of a chemical mechanical polishing apparatus. Hence, it is respectfully submitted that the computer of Heynacher would not use an air pressure load or such a distance in determining forces, as Heynacher fails to anticipate an air pressure load or such a distance. Therefore, claim 4 is believed to be allowable over Heynacher for at least this additional reason as well.

Conclusion

For at least the forgoing reasons, the Applicants believe all claims now pending in this application are in condition for allowance. The Applicant respectfully requests that a timely

Notice of Allowance be issued in this case. If the Examiner believes a telephone conference would expedite prosecution of this application, please contact the undersigned.

Respectfully submitted,
Aka Chan LLP

/Peggy A. Su/

Peggy A. Su
Reg. No. 41,336

Aka Chan LLP
900 Lafayette Street, Suite 710
Santa Clara, CA 95050
Tel: (408) 701-0035
Fax: (408) 608-1599
E-mail: peggy@akachanlaw.com